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<u>L2</u>	L1 same promoter\$	401	<u>L2</u>
<u>L1</u>	myosin adj light adj chain adj 2	514	<u>L1</u>

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From Franz, W. -M. et al (1994), *Cardioscience* (5, 235-243, No. 4), we learn that the microinjection of a naked DNA of myosin light chain 2 (MLC 2) promoter luciferase fusion gene into a male pronucleus of fertilized mice oocytes causes a transgenic mouse that possesses a heart muscle-specific expression of the luciferase.

[0007] Myosin, a main component of the heart muscle and other striped muscles, consists of two heavy chains (MHC) and two pairs of myosin light chains (MLC). The MLC are divided again into non-phosphorizable (MLC 1) and phosphorizable (MLC 2) forms. It was found now that the regulatory nucleic acid sequence (promoter) is differentiated at the 5' end of the MLC 2 gene of the skeletal muscle and the heart muscle of rats, but that the MLC 2 gene of the heart muscle of rats and chickens is preserved, even though rats and chickens are separated from an evolutionary point of view (Henderson, S. A. et al. (1989), *J. Biol. Chem.*, 264, 18142-18148). Lee et al. (Lee, K. J. et al. (1994), *Mol. Cell. Biol.*, 14, 1220-1229, No. 2) found, with respect to transgenic rats, that a combination of positive (HF 1a and HF 1b) and negative (E box and HF 3) regulatory elements that lie within 250 base pairs upstream of the transcription starting point, cause a ventricle chamber-specific expression, even though the receipt of the specificity in a gene therapeutic in vivo application could not be demonstrated until now. However, Franz, W. -M. et al. (1994) cited above found that, also based on transgenic rats, a further regulatory sequence, the so-called heart-specific sequence (CSS), a repressor element lying approx. 1700 base pairs upstream of the transcription starting point, is necessary for the heart muscle-specific expression. From these results, it can be recognized that the mechanism for the heart-specific expression of genes has still not been explained and a heart-specific expression of a gene after in vivo application of the gene has not yet been found..

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END OF SEARCH HISTORY

To recombinantly produce a .beta.-hCG peptide, a nucleic acid sequence encoding .beta.-hCG or a .beta.-hCG peptide is operatively linked to a promoter such that .beta.-hCG or a .beta.-hCG

peptide is produced from said sequence. For example, a vector can be introduced into a cell, within which cell the vector or a portion thereof is expressed, producing .beta.-hCG or one or

more portions thereof. In a preferred embodiment, the nucleic acid is DNA if the source of RNA polymerase is DNA-directed RNA polymerase, but the nucleic acid may also be RNA if the source

of polymerase is RNA-directed RNA polymerase or if reverse transcriptase is present in the cell or provided to produce DNA from the RNA. Such a vector can remain episomal or become

chromosomally integrated, as long as it can be transcribed to produce the desired RNA. Such vectors can be constructed by, recombinant DNA technology methods standard in the art. Vectors can

be plasmid, viral, or others known in the art, used for replication and expressions in bacterial or mammalian cells. Expression of the sequence encoding .beta.-hCG or the .beta.-hCG peptide

can be by any promoter known in the art to act in bacterial or mammalian cells. Such promoters can be inducible or constitutive. Such promoters include, but are not limited to the SV40 early

promoter region (Bernoist and Chambon, 1981, Nature 290:304-310), the promoter contained in the 3' long terminal repeat of Rous sarcoma virus (Yamamoto et al., 1980, Cell 22:787-797), the

HSV-1 (herpes simplex virus-1) thymidine kinase promoter (Wagner et al., 1981, Proc. Natl. Acad. Sci. USA 78:1441-1445), the regulatory sequences of the metallothionein gene (Brinster et

al., 1982, Nature 296:39-42), etc., as well as the following animal transcriptional control regions, which exhibit tissue specificity and have been utilized in transgenic animals: elastase I

gene control region which is active in pancreatic acinar cells (Swift et al., 1984, Cell 38:639-646; Ornitz et al., 1986, Cold Spring Harbor Symp. Quant. Biol. 50:399-409; MacDonald, 1987,

Hepatology 7:425-515); insulin gene control region which is active in pancreatic beta cells (Hanahan, 1985, Nature 315:115-122), immunoglobulin gene control region which is active in

lymphoid cells (Grosschedl et al., 1984, Cell 38:647-658; Adames et al., 1985, Nature 318:533-538; Alexander et al., 1987, Mol. Cell. Biol. 7:1436-1444), mouse mammary tumor virus control

region which is active in testicular, breast, lymphoid and mast cells (Leder et al., 1986, Cell 45:485-495), albumin gene control region which is active in liver (Pinkert et al., 1987, Genes

and Devel. 1:268-276), alpha-fetoprotein gene control region which is active in liver (Krumlauf et al., 1985, Mol. Cell. Biol. 5:1639-1648; Hammer et al., 1987, Science 235:53-58), alpha

1-antitrypsin gene control region which is active in the liver (Kelsey et al., 1987, Genes and Devel. 1:161-171), beta-globin gene control region which is active in erythroid cells (Mogam

et al., 1985, Nature 315:338-340; Kollias et al., 1986, Cell 46, 89-94), myelin basic protein gene control region which is active in oligodendrocyte cells in the brain (Readhead et al.,

1987, Cell 48:703-712), myosin light chain-2 gene control region which is active in skeletal muscle (Sani, 1985, Nature 314:283-286); and gonadotropin releasing hormone gene control region

which is active in the hypothalamus (Mason et al., 1986, Science;234:1372-1378). The promoter element which is operatively linked to the nucleic acid encoding .beta.-hCG or a .beta.-hCG

peptide can also be a bacteriophage promoter with the source of the bacteriophage RNA polymerase expressed from a gene for the RNA polymerase on a separate plasmid, e.g., under the control

of an inducible promoter, for example, the nucleic acid encoding .beta.-hCG or .beta.-hCG peptide operatively linked to the T7 RNA polymerase promoter with a separate plasmid encoding the

T7 RNA polymerase.